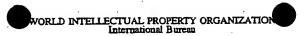
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(54) Title: DEPILATION

(57) Abstract

Mammalian hair is depilated using a laser source capable of emitting pulsed radiation, each pulse having a duration of 1μ s to 1ms, the radiation having a wavelength in the range of 600 to 1500mm. A selected area of a patient's skin is irradiated by the pulsed radiation, the area having a plurality of irradiation zones; the laser source is successively pulsed so as to irradiate successive zones of the treatment area with the radiation, so as to destroy subdermal biological material associated with hair growth.

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Depilation

The present invention is concerned with a method of depilation of mammalian hair and also apparatus for use in the method.

U.S. Patents 3538919 and 4617926 are both concerned with depilation. These patents teach the stepwise irradiation of single hairs or hair follicles; the process described in U.S. 3538919 involves inserting a laser probe within a hair follicle and the process described in U.S. 4617926 involves inserting a single hair within a bore of a fibre optic probe. These processes are time consuming, and can lead to unnecessary discomfort to a patient.

We have now developed a method and apparatus which alleviates the above problems.

According to the present invention there is provided a method of depilation of mammalian hair, which method comprises:

- (a) providing a laser source capable of emitting pulsed radiation, each pulse having a duration of 1μ s to 1ms, said radiation having a wavelength in the range of 600 to 1500nm;
- (b) selecting a treatment area of a patient's skin to be irradiated by said pulsed radiation, said treatment area including a plurality of irradiation zones; and
- (c) successively pulsing said laser source so as to irradiate successive zones of said treatment area with said radiation, so as to destroy subdermal biological material associated with hair growth.

It is preferred that the laser source comprises either a ruby laser (wavelength 694.3nm), a neodymium YAG laser (wavelength $1.064\mu m$) or other lasers having a wavelength in the abovementioned (visible red to near infra-red) range. The selection of a laser having a wavelength in the range of 600 to 1500nm is advantageous in that radiation of this wavelength is capable of selectively destroying cells or other subdermal biological material responsible for hair growth, whilst not being substantially absorbed by surrounding cells or tissue.

It is preferred that a laser with variable pulse duration is used. This is advantageous in facilitating irradiation of selected intensity, depending on the required application of the laser.

Advantageously, the irradiation zones are juxtaposed so as to substantially cover the treatment area. Preferably the successive irradiation involves irradiation in boustrophedon manner, so as to ensure substantially complete irradiation of the treatment area.

It is preferred that the irradiation destroys cells present at the root of individual hair follicles; optionally, the irradiation may further destroy cells present in respective bulge regions of follicles.

There is further provided by the present invention depilation apparatus for use in a method as described above, the apparatus comprising:

- (a) a laser source capable of emitting pulsed radiation, wherein each pulse has a duration of 1μ s to 1ms, the radiation having a wavelength in the range of 600-1500nm; and
- (b) means for irradiating a zone of a patient's skin with said radiation, so as to be capable of destroying biological material present in said irradiation zone, associated with hair growth.

The apparatus may advantageously further comprise means for effecting irradiation of successive zones of the patient's skin. Typically, means are provided for effecting movement of the apparatus relative to the patient's skin so as to irradiate the skin in a boustrophedon manner substantially as described above.

Claims:

- 1. A method of depilation of mammalian hair, which method comprises:
 - (a) providing a laser source capable of emitting pulsed radiation, each pulse having a duration of 1μ s to 1ms, said radiation having a wavelength in the range of 600 to 1500nm;
 - (b) selecting a treatment area of a patient's skin to be irradiated by said pulsed radiation, said treatment area including a plurality of irradiation zones; and
 - (c) successively pulsing said laser source so as to irradiate successive zones of said treatment area with said radiation, so as to destroy subdermal biological material associated with hair growth.
- A method according to claim 1, wherein said laser source comprises a ruby laser having a wavelength of 694.3nm or a neodymium YAG laser having a wavelength of 1.064μm.
- 3. A method according to claim 1 or 2, wherein said laser source has a variable pulse duration.
- 4. A method according to any of claims 1 to 3, wherein said irradiation zones are juxtaposed so as to substantially cover said treatment area.
- 5. A method according to any of claims 1 to 4, wherein said successive irradiation of said treatment area is in boustrophedon manner, so as to ensure substantially complete irradiation of said treatment area.
- 6. Depilation apparatus for use in a method according to any of claims 1 to 5, said apparatus comprising:
 - (a) a laser source capable of emitting pulsed radiation, wherein each pulse has a duration of 1μ s to 1ms, the radiation having a wavelength in the range of 600-1500nm; and
 - (b) means for irradiating a zone of a patient's skin with said radiation, so as to be capable of destroying biological material present in said irradiation zone, associated with hair growth.

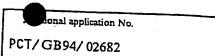
- 7. Apparatus according to claim 6, which further comprises means for effecting irradiation of successive zones of a patient's skin.
- 8. Apparatus according to claim 6 or 7, which includes means for effecting movement of said apparatus relative to said patient's skin so as to irradiate said skin in a boustrophedon manner.

INTERNATIONAL SEARCH REPORT

Inter	mal .	Application	No
	/GB	94/026	82

A. CLASSIF IPC 6	FICATION OF SUBJECT MATTER A61B17/41		
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	International Patent Classification (IPC) or to both national classification	cation and IPC	
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C DOCTIM	ENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the re	levant passages	Relevant to claim No.
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X	WO,A,92 19165 (VICTORIA UNIVERSITMANCHESTER) 12 November 1992	Y OF	6,7
*	see page 2, paragraph 3		
A	US,A,5 059 192 (ZAIAS) 22 October see column 3, line 39 - line 40	1991	6
A .	US,A,4 718 416 (NANAUMI) 12 Janua see column 3, paragraph 1	ary 1988	8
A	US,A,5 065 515 (IDEROSA) 19 Novel see column 2, line 42 - line 45 see column 4, line 34 - line 39	mber 1991	8
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Fur	ther documents are listed in the continuation of box C.	Patent family members are listed	in annex.
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INTERNATIONAL SEARCH REPORT



Box I	Observational	PC17 GB947 02682
- JUX I	Observations where certain claims were found unsearchable (Continuation of	item 1 of first sheet)
This into	ernational search report has not been established in respect of certain claims under Arti	icle 17(2)(a) for the following reasons:
1. X	Claims Nos.: 1-5 because they relate to subject matter not required to be searched by this Authority, na	umely-
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	Claims Nos.: because they relate to parts of the international application that do not comply with the an extent that no meaningful international search can be carried out, specifically:	e prescribed requirements to such
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	recause they are dependent claims and are not drafted in accordance with the second ar	
ox II	Observations where unity of invention is lacking (Continuation of item 2 of firs	t sheet)
	national Searching Authority found multiple inventions in this international application	
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	No protest accompanied the payment	of additional search fees.

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No GB 94/02682

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